



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
In re the Application of

Takahiro HAYASHI et al.

Group Art Unit: 1744

Application No.: 10/082,250

Examiner: V. PATEL

Filed: February 26, 2002

Docket No.: 112052

For: APPARATUS FOR GENERATING HYDROGEN GAS

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants hereby request review of the September 9, 2005 Final Rejection in this application. A Notice of Appeal and fee in the amount of \$500 are filed concurrently herewith.

I. Status of Pending Claims

Claims 1-28 are pending. Claims 1-28 are rejected. No amendments are being filed with this request.

II. Grounds of Rejection Presented For Review

The following grounds of rejection are presented for review: (1) claims 1-28 are rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 6,802,875 ("Kimbara").

Claims 1, 6 and 28 are the rejected independent claims.

On page 2 of the Final Rejection, the Patent Office alleges that Kimbara teaches a reactor 26 with a catalyst that is heated (by a heat exchanger, i.e., a heater) to produce a hydrogen gas. It is unclear which disclosure of Kimbara allegedly corresponds to the reaction

tank recited in claims 1 and 28, or the reaction-regeneration tank recited in claim 6. The Patent Office further alleges that it is clear that a liquid-film is formed by the liquid flowing over the catalyst and reactor 26, and thus Kimbara is allegedly capable of forming a liquid-film on the catalyst. The Patent Office also alleges that Kimbara allegedly teaches a hydrogenation reactor and a dehydrogenation reactor 26 that may both contain a nickel catalyst capable of either reaction.

Applicants strongly disagree with the Examiner's allegations and submit that Kimbara does not teach or suggest the apparatus for generating hydrogen gas as recited in claims 1-28.

Applicants submit that Kimbara does not teach or suggest (1) a reaction tank as recited in claims 1 and 28, or a reaction-regeneration tank as recited in claim 6, containing therein a catalyst and a heater, (2) that the fuel forms a liquid-film on the catalyst as recited in claims 1 and 6, and (3) that one tank functions as both a reaction tank and a regeneration tank as recited in claim 6.

First, Applicants submit that the Final Rejection is in error because Kimbara does not teach or suggest a reaction tank as recited in claims 1 and 28, or a reaction-regeneration tank as recited in claim 6, containing therein a catalyst and a heater. The reaction tank recited in claims 1 and 28 and the reaction-regeneration tank in claim 6 clearly include a catalyst and a heater therein. See Figure 1 of the specification, which clearly shows that the catalyst 18 and the first heater 22 are inside the reaction tank 20. Similarly, Figure 6 of the specification clearly demonstrates that the catalyst 66 and the heater 68 are contained within the reaction-regeneration tank.

In contrast, Kimbara teaches an auxiliary tank 20, which the Patent Office alleges corresponds to the reaction tank. See Figure 1 of Kimbara. Kimbara teaches that an inlet and outlet of a circulation pipe 21 are connected to the auxiliary tank 20. See column 6, lines 27-28 of Kimbara. The circulation pipe is provided with a pump 22, a first heat exchanger 23, a

dehydrogenation reactor 24, a second heat exchanger 24, a hydrogenation reactor 26 and a condenser. See column 6, lines 28-31. Clearly, the catalyst 24 and the first heater 23 are outside the auxiliary tank 20. See Figure 1 of Kimbara. The auxiliary tank is merely connected to the catalyst 24 and the first heater 23 by a pipe.

Further, even if the hydrogenation reactor 26 taught by Kimbara is interpreted to correspond to the reaction tank of claims 1 and 28 or the reaction-regeneration tank of claim 6, it still does not contain therein a catalyst and a heater for heating the catalyst. The heater 29 is located outside the hydrogenation reactor 26. See Fig. 1 of Kimbara. Further, it does not heat any catalyst. Instead, the heater 29 and a cooling fan 30, both located outside the hydrogenation reactor 26, maintain the internal temperature of the hydrogenation reactor 26. The heater 29 does not heat the catalyst within the hydrogenation reactor 26. In addition, the hydrogenation reactor 26 is not a tank, and is not connected to the supplying means as required in claims 1, 6 and 28.

Moreover, the dehydrogenation reactor 24 as taught by Kimbara, if interpreted to correspond to the reaction to the reaction tank recited in claims 1 and 28 or the reaction-regeneration tank, still does not contain therein a catalyst and a heater for heating the catalyst. The dehydrogenation reactor 24 contains a catalyst. See column 6, lines 32-33 of Kimbara. However, the dehydrogenation reactor 24 does not contain therein a heater for heating the catalyst. The heat exchangers 23 and 25 are located in the circulation pipe, not within the dehydrogenation reactor. 24. See column 6, lines 28-31 of Kimbara. In addition, the dehydrogenation reactor 24 is not a tank, and is not connected to the supplying means as required in claims 1, 6 and 28.

In summary, Kimbara does not teach or suggest a reaction tank, or reaction-regeneration tank, containing therein a catalyst and a heater for heating the catalyst, as recited in claims 1, 6 and 28.

Second, Applicants submit that the Final Rejection is clearly in error because Kimbara does not teach or suggest that the fuel forms a liquid-film on the catalyst as recited in claims 1 and 6. The liquid-film state required in claims 1 and 6 is a state in which the surface of the catalyst is slightly wetted with liquid fuel, and is very different from a state in which a catalyst is heavily soaked with a large amount of liquid fuel. See page 13, lines 3-25 of the specification. By dehydrogenation of the fuel in the liquid-film on the surface of the catalyst, excellent reactivity is obtained in comparison to where the fuel is made to react on the surface of the catalyst in, for example, a gaseous state. See page 13, lines 3-25 of the specification.

As admitted by the Patent Office in the Final Rejection and during the December 6, 2005 interview, Kimbara, at best, merely teaches a liquid that may be blown over the catalyst in reactor 26. In other words, Kimbara does not teach or suggest a liquid-film formed over the catalyst as required in claims 1 and 6. Thus, the catalyst is not contained within the reaction tank as explained above, nor is a liquid-film formed on the catalyst.

Third, Applicants submit that the Final Rejection is clearly in error because Kimbara does not teach or suggest that one tank functions as both a reaction tank and a regeneration-tank as recited in claim 6. This argument has not been addressed by the Patent Office in either the September 9, 2005 Final Rejection, nor the December 6, 2005 personal interview, although discussed.

The reaction-regeneration tank 70 is provided with a (1) reactor comprised of a heater 68, which is used during fuel dehydrogenation and naphthalene hydrogenation, and (2) a precious metal based catalyst 66. See page 26, lines 15-19 of the specification. A fuel recovering device 64 for recovering unreacted fuel and regenerated fuel in a liquid state is provided at an upper side of the reaction-regeneration tank 70. See page 26, lines 19-23 of the specification. Kimbara clearly does not teach or suggest one tank that functions as both a reaction tank and a regeneration tank.

For the foregoing reasons, Applicants respectfully submit that Kimbara does not teach or suggest all of the features recited in claims 1-28. Reconsideration and withdrawal of this rejection are thus respectfully requested.

III. New Reference in Advisory Action

In the Advisory Action mailed on January 17, 2006, the Patent Office states that the previously filed response allegedly does not place the application in condition for allowance because "Applicant has not amended claims to overcome rejections as previously set forth in the final rejection and further evidenced by U.S. Patent No. 6,074,447." To date, U.S. Patent No. 6,074,447 has not been relied upon in any rejection of claims 1-28.

IV. Conclusion

For all of the reasons discussed above, it is respectfully submitted that the rejection is in error and that all the pending claims are in condition for allowance. For all of the above reasons, Applicants respectfully request the panel of Examiners to review the June 17, 2005 Final Rejection prior to Appeal and to withdraw the rejection therein.

Respectfully submitted,

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Date: February 9, 2006

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